

Title: Maize Peroxidase Genes and Their Use for Improving
Plant Disease Resistance and Stalk Strength
Inventor(s): Duvick et al
Application No: Not Assigned
Atty Dkt No: 35718/242052(5718-158)

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	1	50
Zm-POX01	(1) -----	
Zm-POX04	(1) -----QLSPTFYASSCPNLQSIVRAAMTQAVASEQRM	
Zm-POX05	(1) -----TVTVNEPIANGLWSFYDVSCPSVEGIVRWHVAEAIRR DIGT	
Zm-POX06	(1) ASSAAHGYGYGYGGDAAELRVGFYKDSCPDAEAVVRIVAKAVREDPTA	
Zm-POX07	(1) -----GLLESNPGLAYNFYKNSCPSVDSIVRSVTWAQVAANPAI	
Zm-POX08	(1) -----SPPGKLEVGFYEHSCPQAEDIVRNAVRRGIAAREPGW	
Zm-POX10	(1) -----AVRELKVGVYAE[CPEAEDIVRETMARARAREARS	
Zm-POX16	(1) -----QLSSTFYDTSCPSCSAMSTSSGVNSAVAQQARV	
Zm-POX17	(1) -----QLKEGFYDYSCPQAEKIVKDYVKAHTPHAPDV	
Zm-POX18	(1) -----AGAAGLDMNFYGSCTPCRVEAIVKEEMVATLKAAPTL	
Zm-POX20	(1) -----QLTADYYDCTCPDAYNIVKQVLIEAHKSDVRI	
Zm-POX21	(1) -----RPVLTPLGTSRPAAGDLSVYFHADSCPQLETIVRSSVDAALQQNVRL	
Zm-POX24	(1) -----QLSPTFYDSSCPNALSTIKSAVNAAVQKENRM	
Zm-POX26	(1) -----QLRVGFYDSSCPAAEIIIVQQEVSRAVAANPGI	
Zm-POX28	(1) -----QLRQNYYGSSCPSAESTVRSVTSQRLQQSFAM	
Zm-POX31	(1) -----AHGYGAYGYGDDAAELRVGFYKDSCPDAEAVVRIVAKAVQEDPTA	
Zm-POX34	(1) -----QLKEGFYDYSCPQAEKIVKDYVKAHTPHAPDV	
Zm-POX37	(1) -----GLTAQLRQDYYAAVCPDLESIVRAAVSKVQAQPVA	
Consensus	(1) QL FY SCP AESIVR V AV P V	
	51	100
Zm-POX01	(1) -----	
Zm-POX04	(33) GASLLRLFFFHDCFVQGCDGSILLDAGG-----EKTAGPNLNSVRGFEV	
Zm-POX05	(43) AAGLIRTRFFFHDCFPQGCDASVLLSGSN-----SEQIEVPNQTLRPEALKL	
Zm-POX06	(51) NAPLLRLHFHDCFVRGCDGSVLLNSTRGNT--AEKDAKPN-HT-LDAFDV	
Zm-POX07	(40) PARLLRLHFHDCFVKGCDASILLDTAQ----SEKTAAPN-LS-VGGYEV	
Zm-POX08	(37) GAGLIRMFHDCFVRGCDGSILLNSTPDNK--AEKDSVANNPS-MRGFDV	
Zm-POX10	(36) VASVMRLQFHDCFVNGCDGSVLMDAPTPTMPG--EKDALSNINS-LRSFEV	
Zm-POX16	(33) GASLLRLHFHDCFVQGCDASILLNNTS----GEQTQPPNLTLNPRAFDV	
Zm-POX17	(33) ASTLLRTHFHDCFVRGCDASVLLNATGGSE--AEKDAAPN-LT-LRGFGF	
Zm-POX18	(37) AGPLLRLHFHDCFVRGCDASVLLDSTPTST--AEKDATPN-LT-LRGFGS	
Zm-POX20	(33) YASLTCLHFHDCFVQGCDGSVLLDAVPGVANSTEKLAPANNN--ARGFPV	
Zm-POX21	(48) TAGLLRLLFHDCFPQGCDASILLDNG----ERGLPPNVGLQQEAVQI	
Zm-POX24	(33) GASLLRLHFHDCFVQGCDASVLLADNAATGFTGEQGAAPNAGS-LRGFDV	
Zm-POX26	(33) AAGLLRLHFHDCFVGGCDASVLLDSTKGN--AEKDAGPN-LS-LRGFEV	
Zm-POX28	(33) GPGTLRLFFFHDCFVRGCDASVLLMAP--NGDDESHSGADATLSPDAVDA	
Zm-POX31	(47) NAPLLRLHFHDCFVRGCDGSVLLNSTRGNT--AEKDAKPN-HT-LDAFDV	
Zm-POX34	(33) ASTLLRTHFHDCFVRGCDASVLLNATGGSE--AEKDAAPN-LT-LRGFGF	
Zm-POX37	(37) VGATIRLFFFHDCFVEGCDASVLLVSTG--NNTEKDHPSNLSQLAGDGFDT	
Consensus	(51) AA LLRLHFHDCFV GCDASVLL AT AEKDA PN S LRGFDV	

FIG 1A

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	101	150	
Zm-POX01	(1)	-----MSCCMQGG-----	GPA
Zm-POX04	(76)	IDTIKRNV EAA CPGVVSCADILALAARDGTNLLG-----	GPT
Zm-POX05	(88)	IDDI RAV HAVCGPTVSCADITTLATRDAVVASG-----	GPF
Zm-POX06	(97)	IDDIKEALEKRCPGTVSCADILATAARD AVS LA TKVVT KGWSRDGNL	
Zm-POX07	(83)	IDA IKA QLERA V ALAARD AVS YQFK-----	ASL
Zm-POX08	(84)	VD DAKAV LEAHCPRTVSCADIV AFA ARD SAY LAG-----	GLD
Zm-POX10	(83)	VD EIKDALE ERCPGVVSCADIV IMA ARD AVV LTG-----	GPN
Zm-POX16	(78)	VNS IKAQ VEAA V PGVVSCADILAV A ARDGVVALG-----	GPS
Zm-POX17	(79)	IDRIK ALLE KE V ALAV A ARD AVS VGVI G -----	GPF
Zm-POX18	(83)	VQRV KDR LEEA V PGNVSCADIV L ALMARD AVV LA N -----	GPS
Zm-POX20	(82)	VD KVK AALEDA V PGVVSCADILALAAEIS S VELSG-----	GPK
Zm-POX21	(91)	VED IRGK V HAA CGPTVSCADITVLATRDAV S LSG-----	GPS
Zm-POX24	(82)	IANIKAO VE AV C KQTVSCADILAV A ARD AVS VALG-----	GPS
Zm-POX26	(79)	VD RIKAR VEQA V FGVVSCADILAF A ARD S VALAG-----	GNA
Zm-POX28	(80)	INKAKAA VE ALPGCAGKV S CADILAM A ARDVV S LLG-----	GPS
Zm-POX31	(93)	IDDIKEALEKR V PGTVSCADILATAARD AVS LA TKVVT KGWSRDGNL	
Zm-POX34	(79)	IDRIK ALLE KE V PGVVSCADIV A ARD AVS VGVI G -----	GPF
Zm-POX37	(85)	VIQAKAA V DAVPACANQV S CADILALATRD V IELAG-----	GPS
Consensus	(101)	ID IKA LE CPG VSCADILALAARDAV LAG	GP
	151	200	
Zm-POX01	(12)	YK LPL GRRDGLAPASNAAVLAALPPPTS K MPTLLSFLAKI-NLDVTD L V A	
Zm-POX04	(113)	WSV PL GRRDSTTASASLANS-NPPPPTAS L GTLISLFGRQ-GLSPRD M TA	
Zm-POX05	(125)	FEV PL GRRDGLAPASSDLVG-TLPAPFFD V PTLIESF K NR-SLDKAD L V A	
Zm-POX06	(145)	YQVET GRRDGRV SR A KEAVK-NLPDSMDG T RKLIRRF A SK-NLS V KDLAV	
Zm-POX07	(121)	WQVET GRRDGT V S LA NTG -ALPSPFAGFAG L QSF S DR-GLNL T DL V A	
Zm-POX08	(121)	YK VPSGRRDGRV SK E VL D NN W P A PT D E V DELIESF K RK-GLNADD M VT	
Zm-POX10	(120)	WEVRLG-RE DSMTA SO E DADN I MPSPRANASALIRLF A GL-NLS V TD L V A	
Zm-POX16	(115)	WT VLLGRRD S-TGSFPSQTS-DLPPPTSS Q ALLAA Y SKK-NLDATD M V A	
Zm-POX17	(116)	WSVPT GRRDGT V S IK Q EALD-Q I P A PTMNFT Q LLQSF F QNK-SLN L AD L V W	
Zm-POX18	(120)	WP VALGRRYGRV SL A NETN-QLPPPTAN F TRLV S MFAAK-GL S VRDL V V	
Zm-POX20	(119)	WA VLLG -RL DSKK AD F KSAENLP-SPFD N LT V LE Q KFAAV-GLHT V DL V A	
Zm-POX21	(128)	FTV PL G RLD SAA P ASSNDVF-TLPPPTAT V DELLTAF G SKN L SD P AD L V A	
Zm-POX24	(119)	WT VPLGRRDSTT AS S LANS-DLPPPF N LG Q LI T A F GNK-GFTATE M AT	
Zm-POX26	(116)	YQVPA GRRDGSV SR A SDTNG-NLPPPTAN V AQ I T Q IF C TK-GL T Q K E M VI	
Zm-POX28	(119)	Y GVEL GR LDG KTFNRAIVKH-VLP PGPGF N I D Q LNALFAQ N -GL T Q D MIA	
Zm-POX31	(141)	YQVET GRRDGRV SR A KEAVK-NLPDSMDG T RKLIRRF A SK-NLS V KDLAV	
Zm-POX34	(116)	WSVPT GRRDGT V S IK Q EALD-Q I P A PTMNFT Q LLQSF F QNK-SLN L AD L V W	
Zm-POX37	(124)	Y AVEL GR LDGLV SM S T N VDG-KLPPPS F N I D Q LTS I F A LN-NL S QADMIA	
Consensus	(151)	W V PLGRRD G V S A E LP PT NL LI FA K LS DL V A	

FIG 1B

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		201		250
Zm-POX01	(61)	LSGGHTVGIAHCGSF DNRLFP-----TQDP TLNKFFAGQLYRTCPNT		
Zm-POX04	(161)	LSGAHTIGOARCTTFRGRITYG-----DTPINASFAALRQQTCPRS		
Zm-POX05	(173)	LSGAHTVGRGHCVSFSDRLPP-----NADDGTM DPAFRQRLTAKCASD		
Zm-POX06	(193)	LSGAHAIGKSHCP SIAKRLRNFTAHR---DSDPTLDGAYAAELRRQCRSR		
Zm-POX07	(168)	LSGAHTIGVASCSVT PRLYQGNASS---VDPLLDSAYARTLMSSCPNP		
Zm-POX08	(170)	LSGAHTIGRSHCSFTERLYNFSQQLG--RTDPSLDPAYAEHLKMRCPWP		
Zm-POX10	(168)	LSGSHS IGEARCSIVFRLYNQSGSG---RPDPHM D TAYRRSL DALCPKG		
Zm-POX16	(162)	LSGAHTIGQAQCSSFNGHITYN-----DTNINA AFATSLKANCPMS		
Zm-POX17	(164)	LSGAHTIGISOCNSF SERLYNFTGRGGPDDADPSLDPLYAAKLRLKCKTL		
Zm-POX18	(167)	LSGGHTLGTAHCNL FSDRLYNFTGANSIADVDPALDAAYLARLRSRCRSL		
Zm-POX20	(166)	LSGAHTFGRVQ CQFVIGRLYNFSGTN---RPDP TLNSGYRAFLAQRCPQN		
Zm-POX21	(177)	LSGAHTVKGKARCSSFGDVAGP-----ATDDVTR-----CVTATCSAP		
Zm-POX24	(167)	LSGAHTIGQAQCKNFRDHIY N-----DTNINOQFASSLKANCPRP		
Zm-POX26	(164)	LSGAHTIGSSHCSFSGRILSGSATTAG--GQDP TM D PAYVAOLARQCPQG		
Zm-POX28	(167)	LSGAHTIGVTHCDKFVRRIT YTFKQ---RLAWNPPMNLDFLRSLLRRVCPLS		
Zm-POX31	(189)	LSGAHAIGKSHCP SIAKRLRNFTAHR---DSDPTLDGAYAAELRRQCRRR		
Zm-POX34	(164)	LSGAHTIGISOCNSF SERLYNFTGRGGPDDADPSLDPLYAAKLRLKCKTL		
Zm-POX37	(172)	LSAAHTVGF AHCS TFS DRIT Q-----PQSVDPTM NATYAEDLQAA CPAG		
Consensus	(201)	LSGAHTIG AHC SFS RLYN G DPTLD AYAA LR CP		
		251		300
Zm-POX01	(103)	AT----VNTTANDVRTPNAFDNKYYVDLLNREG---LFTSDQ DLLTN--		
Zm-POX04	(201)	GGDG----NLAPLTDVQTPVRFDTAYFTNLLSRRG---LFHSDQELFNG--		
Zm-POX05	(216)	PSGN---VVTQVLDVRTPNAFDNKYYFDLIAKQG---LFKSDQGLINHP-		
Zm-POX06	(240)	RD----NTTELEMVPGSSTA FG TAYYGLVAERRA---LFHSD E ALLRN--		
Zm-POX07	(214)	SP----ASATVALDGGTPFREDSSYYSRVQQKQG---TLASDAA LAQN--		
Zm-POX08	(218)	SSNDQMDPTV VPLDPVTPATEFDNQYYKVNLAHKV---LFI SDN T LLEN--		
Zm-POX10	(215)	GD----EEVTGGLD-ATPRVFDNQYFEDLVALRG---FLNSDQTLFSD--		
Zm-POX16	(202)	GGS----S LAPLDTMTPTVHDNDYYKNLISQKG---LLHSDQELFNN--		
Zm-POX17	(214)	TD----NTTIVEMDPGSFR FDL SYYRGVLKRRG---LFQSDAALITD--		
Zm-POX18	(217)	AD----NTT LNEMDPGSFLSFDSSYYSLVARRRG---LFHSDA ALLT D--		
Zm-POX20	(213)	GS----PSALNDLDPPTPNLFEDNHYYTNLEVNRG---FLGS DQELK SAPQ		
Zm-POX21	(214)	GSG----DTLRDLDFLTPAVFDNLYF EVELTLRKNKGVM LPSDQGLVSDP-		
Zm-POX24	(207)	TGSGD--GNLAPLDTTTPYSEFDNAYYSNLLS QKG---LLHSDQELFNG--		
Zm-POX26	(212)	G-----DPLVPM DYVSPNAFDEGFYKG VMSNRG---LLSSDQ ALLSD--		
Zm-POX28	(214)	YSP----TAFAMLDVTTPRVFDNAYE FNNLRYNKG---LLASDQVLFIDR-		
Zm-POX31	(236)	RD----NTTELEMVPGSSTA FG TAYYGLVAERRA---LFHSD E ALLRN--		
Zm-POX34	(214)	TD----NTTIVEMDPGSFR FDL SYYRGVLKRRG---LFQSDAALITD--		
Zm-POX37	(215)	VDP----NIALQLDPVTPQAFDNQYFANLVDGRG---LFASDQVLFSDA-		
Consensus	(251)	L LD TP FD NAYY LL RRG LF SDQ ALLS		

FIG 1C

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		301	350
Zm-POX01	(143)	-- A TTRP I TVTRFAVD--QDAFFDQFVYSY M KMG Q VNVLTGSQ-G Q VRANC	
Zm-POX04	(242)	-- G SQDALVRO Y SA--SASLFNADF V AM I RMGN V GVLTGTA-G Q IRRNC	
Zm-POX05	(259)	--DT K RATR F ALN--QAAFFDQF A RS M V K MS Q MD I LTG-SAGEIRRNC	
Zm-POX06	(281)	-- G ETRA V Y R Y D AP S EA P FLADFG A SM L N M GR V GVL T GAQ-GEIRKRC	
Zm-POX07	(255)	-- A AAA Q M V ADLT N --PI K Y A FS M SM K K M GR V D V LT G AN-G Q IR K QC	
Zm-POX08	(263)	--PWTAG M V H FNAA-VEKA W Q V K F AK M K M GR V QVL T G D E-GEIREKC	
Zm-POX10	(255)	--NTRTR R VER L SK--D Q DAF F RA F IE G GM I K M GE Q --NPRKGEIRRNC	
Zm-POX16	(242)	--GST D TS V SN F AS--SF G R L H Q RL H GG G ED G E P PRPA H R D Q-WAD Q AHL	
Zm-POX17	(255)	-- A ASK A D I LS V IN-AP E PE V F Q V F AG S M V K M GA I E V K T G S E-GEIRKHC	
Zm-POX18	(258)	--PAT R AY V QR Q AT G LT A EF R DF A DS M V K M S T I D V LT G QQ Q GE I R K KC	
Zm-POX20	(256)	A Q G V T A P V D Q F A T--SQAA F SS F AQ S MIN M G N T Q PL T DA K GE V RCDC	
Zm-POX21	(259)	--RT S W L V Q GF A D N --H W W F D Q F R T S M I K M SQL R GP Q G-N V GEIRRNC	
Zm-POX24	(250)	--GST D NT V R N F AS --NSAA F SS F AA A M V K M GN I SPL T G S Q-G Q IR L TC	
Zm-POX26	(251)	--KNT A V Q V V T Y AN--DPAT F Q A D F AA A M V K M GS V GVL T G T S-G K VRANC	
Zm-POX28	(256)	--RS R PT V N L FA AN --AT A F Y EA F VA A MA K L G RI G L K TG-AD G EIRRVC	
Zm-POX31	(277)	-- G ETRA V Y R Y D AP S EA P FL A EF G A SM L N M GR V GVL T GAQ-GEIRKRC	
Zm-POX34	(255)	-- A ASK A D I LS V IN-AP E PE V F Q V F AG S M V K M GA I E V K T G S E-GEIRKHC	
Zm-POX37	(257)	--RS Q PT V V W A Q N--AT D FE Q A F V D A I TR L GR V G V K T D P SL G VR R DC	
Consensus	(301)	G TR LV FA FF FAASMV K MG V VLTG GEIRK C	

		351	397
Zm-POX01	(188)	SARN G AA A AG D SDLP W SS V VI E T V ADA A GS L VL--	
Zm-POX04	(287)	RVVNS-----	
Zm-POX05	(303)	SVRNT A LG D V S SA Q LETT A DE G LA A DA-----	
Zm-POX06	(328)	AFVN-----	
Zm-POX07	(299)	RQVNTS-----	
Zm-POX08	(308)	FAVN P HY-----	
Zm-POX10	(299)	RVAN N SP W Q P R T G M AS G Q S T SEL R-----	
Zm-POX16	(287)	LE A Q L V L I I K D GR P I D DA Q S Y RT C M I R H LETT I P M Q T E I Y T Y E Y V	
Zm-POX17	(301)	ALVNKH-----	
Zm-POX18	(306)	NL V N-----	
Zm-POX20	(304)	RVAN D D-----	
Zm-POX21	(303)	FRP N T N G I A A SA-----	
Zm-POX24	(295)	STVN-----	
Zm-POX26	(296)	RVA-----	
Zm-POX28	(300)	TAVN-----	
Zm-POX31	(324)	AFVN-----	
Zm-POX34	(301)	ALVNKH-----	
Zm-POX37	(302)	A F L N-----	
Consensus	(351)	VN	

FIG 1D